NTSC

Digital BETACAM

DVW-700/700WS

Digital BETACAM One-piece Camcorder

Digital 1000

SONY

Lens is optional.

1993 saw the introduction of Digital BETACAM™, a digital component recording format that was a major evolutionary step in the continuing development of video recording and one that built on the technical foundations widely established by the original Betacam® and Betacam SP® analog formats. The Digital BETACAM format brought the full benefits of digital component video recording to many production and post production applications because of its outstanding quality, low cost of ownership and playback compatibility with analog Betacam and Betacam SP recording.

To complete the chain of equipment needed to create programs entirely in the digital domain, Sony has now introduced two Digital BETACAM camcorders, the DVW-700 and the DVW-700WS. They bring full digital component operation to the acquisition process - extending this to widescreen origination with the 16:9/4:3 capability of the DVW-700WS model.

Both camcorders record in the 10-bit Digital BETACAM format and also use 10-bit Digital Signal Processing (DSP) in their camera sections. DSP provides significant improvements in picture, precise RGB color balance and tracking stability, wide range of setup parameters and ease of camera setup. Furthermore the CA-705 Camera Adapter can be attached to the DVW-700/700WS for CCU (Camera Control Unit) operation to expand the creative freedom of the user in very high end EFP applications.

The DVW-700WS, the first 16:9/4:3 switchable camcorder, has been introduced in response to the growing interest in originating television programming in widescreen format.
The introduction of this new camcorder has been made possible by the combined development of the Hyper HAD 1000 FIT 16:9 Widescreen CCD and the advanced technology of digital signal processing.

The DVW-700 and the DVW-700WS, with their operational flexibility, superb performance, compactness and ease of maintenance, were designed to be used at an artistic and creative level that is impossible to achieve with analog cameras.
They bring significant picture making advantages to the current and future needs of the video production and broadcasting communities.

Long Recording Time

To achieve maximum performance and recording time for this high density digital recording, metal particle tapes are used exclusively in the Digital BETACAM VTRs. The use of a highly efficient data handling protocol achieves a maximum recording time of 40 minutes, which is superior to that of the current analog Betacam formats. To prevent the accidental use of conventional Betacam cassette tapes, a special guide rail is used to distinguish them from standard Betacam cassettes.

Robust Cassette Compartment and Dust Protection Systems

The DVW-700/700WS use a new robust cassette compartment that is stationary. The cassette compartment does not pop up to eject the cassette as in the current Betacam transports. This prevents accidental damage of the cassette compartment during eject to further increase reliability. Since the Digital BETACAM cassette is inserted from the top via its narrow side, the entrance of the cassette compartment is much narrower than the current analog Betacam transports. This minimizes dust particles entering the tape transport. A front lid seals the cassette entrance to shut out the flow of air into the tape transport. In addition the DVW-700/700WS incorporate cleaners for both the rotary and the stationary (CTL and TC/CUE) heads to maintain stable recording and reproduction of the video and audio signals.

Low Acoustic Noise

In order to protect the operator and sensitive microphones from the noise generated by the high speed rotating drum, the DVW-700/700WS are designed to lower the acoustic noise to a minimum. An exclusive noise barrier is built in, enclosing the tape transport to retain the scanner noise within the unit.

Field Playback Capability and Viewfinder Playback

Field playback of full color video and two audio channels is provided without a playback adaptor. Two full color composite analog video signals are available on two output ports, in addition one or the other audio channels or a mix of two channels can be selected at the audio monitor output. Inclusion of full color playback capability is made possible by the use of application-specific LSIs which permits extensive digital signal processing with very low power consumption. Field playback is a great advantage for field verification of the recording and permits direct microwave transmission. Field verification is also possible using the viewfinder. The luminance signal can be reviewed in the viewfinder while audio playback is available via an earphone or the built-in loudspeaker.

FEATURES

Choice of Two Digital BETACAM Camcorders

DVW-700 *is a Digital BETACAM camcorder equipped with 4:3 Hyper HAD 1000 FIT CCD sensors, incorporating digital signal processing in the camera section and the Digital BETACAM recording format in the VTR section.*

DVW-700WS *is a Digital BETACAM 16:9/4:3 switchable camcorder which uses a newly developed Hyper HAD 1000 FIT 16:9 widescreen CCD sensor. It achieves full digital video acquisition in both 16:9 widescreen and 4:3 picture formats with the Digital BETACAM recording format.*

GENERAL FEATURES

Superb Picture and Sound Quality with Full Digital Operation

By using digital signal processing in the camera section and the Digital BETACAM recording format in the VTR section, the DVW-700/700WS achieve full digital video acquisition. Both video and audio signals are digitally processed thereby staying in the digital domain from image and sound acquisition to recording.
In combination with the Digital BETACAM studio VTRs and Sony's wide range of digital video equipment, the DVW-700/700WS provide the great advantage of preserving the original picture and sound quality without degradation throughout the process from acquisition through editing to program distribution.

Compact and Lightweight

The development of a compact Digital BETACAM transport and the use of high density application-specific Large Scale Integrated circuits (LSIs) for digital signal processing has made it possible to pack many new and outstanding features into the compact body of the DVW-700/700WS. Almost the same size as the current Sony analog Betacam camcorders, the DVW-700/700WS weigh only 7kg (15lb 7oz) including a viewfinder, battery, cassette, microphone and lens. The extensive use of LSIs also contributes to a low overall power consumption.

Variable High Power Lithium-ion Battery

A lithium-ion battery has been developed to complement the DVW-700/700WS. The BP-L60 and the BP-L90 can be attached directly to a V-shoe attachment on the DVW-700/700WS. This provides the power connection and facilitates a quick and easy battery change. In comparison to conventional NiCd batteries, these lithium-ion batteries have a higher charge capacity in a smaller and lighter weight package. As a result, the BP-L60 provides continuos camcorder operation for approximately 120 minutes and the BP-L90 provides approximately 180 minutes. Since lithium-ion batteries do not suffer from a " memory effect", it is not necessary to fully discharge them to retain their full capacity.
In addition, the BP-L60/BP-L90 incorporate four LEDs as capacity indicators for a quick visual check of the remaining charge. Of course, conventional BP-90A and NP-1B NiCd batteries can also be used with the DVW-700/700WS with optional battery cases.

Refined Ergonomic Design

The excellent balance low center of gravity and low profile of the DVW-700/700WS provide great operational flexibility, providing good peripheral vision for the operator when used on the shoulder. In order to accommodate the varying weight distribution of different lenses and battery systems, the position of the shoulder pad is adjustable. The body of the DVW-700/700WS are made of rugged lightweight diecast magnesium and is rain and dust resistant. This allows the DVW-700/700WS to be used under the harshest of field conditions.

16:9/4:3 Switchable

The DVW-700WS can operate in both widescreen and conventional 4:3 modes without the connection of an external unit. 16:9/4:3 mode switching is easily and quickly executed through the setup menu, and the viewfinder aspect ratio is automatically changed with the mode selection.

VTR FEATURES

Digital BETACAM Recording

The DVW-700/700WS use the Digital BETACAM component digital recording format which provides superb picture quality and multi-generation capability with virtually no dropouts to overcome the limitations of analog recording. The development of a compact transport and a very efficient data handling system has made it possible to record these component digital signals within a Betacam size camcorder and tape cassette.

High Quality Digital Audio

The DVW-700/700WS can record two channel 16-bit digital audio signals to offer high quality sound for field recording. To ensure a very wide dynamic range for the audio signals, linear A/D converters are incorporated. Each of the two audio channels is recorded on two digital audio tracks available in the recording format.

VTR Function Control

The VTR function control buttons are located on the top of the VTR, including Play, Fast Forward, Rewind and Stop. In addition to these basic functions, a high speed Search mode provides recognizable color pictures at speeds ±5 times normal playback.

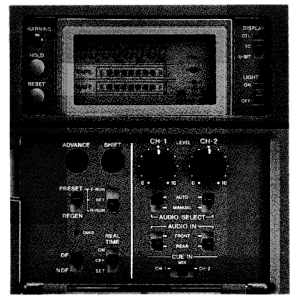
The DVW-700/700WS also incorporate a Record Review function which automatically plays back the last recorded segment when the VTR Standby mode is activated. The transport rewinds the tape for a few seconds, plays back the last recorded segment and precisely stops at the previous position.

Built-in Time Code Generator, Reader and Regenerator

The DVW-700/700WS provide a built-in time code generator/reader. Either real time or preset time code is recorded both as longitudinal time code and vertical interval time code. The VITC insert position can be selected through the menu operation. A time code regenerator is also provided which allows continuous time code to be recorded in the rec-run mode, after exiting the stand-by mode or even when a new recording is started in the middle of previously recorded material. The DVW-700/700WS also provide frame accurate back-space editing.

Comprehensive LCD Display

A extensive LCD display provides critical information of VTR operation. Along with time data including Time Code, CTL and User Bit data, tape remaining and battery capacity is displayed via a bargraph meter. A digital audio peak meter allows precise adjustment of the audio recording level. The time data and the audio level for channel-1 is also displayed in the viewfinder.



Audio Tone Generator

An audio tone generator is provided which allows a 1kHz audio tone to be recorded along with color bars as a reference signal for precise playback of the recordings.

Optional WRR-860A Wireless Microphone Receiver

An optional WRR-860A UHF Wireless Microphone Receiver can be attached to the DVW-700/700WS.

With its compact size and light weight, the WRR-860A provides high quality sound and a wide service area for maximum flexibility in field acquisition.

The WRR-860A can be powered directly from the DVW-700/700WS.

External Microphone Power Supply

The XLR microphone input connectors for the two audio channels can supply (+48V) external microphone power. This function allows external condenser microphones to be used without the need for an external power supply.

CAMERA FEATURES

10 bit/36MHz Full Digital Signal Processing

The DVW-700/700WS incorporate full digital signal processing for the camera circuit which provides not only superb picture quality, but also great advantages for setup of the camera at a level unattainable with conventional analog signal processing.

Superb Picture Quality

The DVW-700/700WS use 10-bit A/D converters for the R, G, B output signals of the CCDs to obtain a wide dynamic range and superior picture quality. In order to maintain this picture quality, the subsequent signal processing is done at more than 10-bits with a maximum of 14-bits and at a 36MHz sampling frequency, which is twice the horizontal clock frequency of the Hyper HAD 1000™ CCD. This also allows very precise and flexible settings for various setup parameters meeting the severe demands of non-linear signal processing required for gamma and knee compensations.

Easy Setup

Potentiometers are virtually eliminated by the adoption of the digital processing, which simplifies the setup of the camera.

High Reliability and Stability

The digital camera circuits also provide high reliability and stability for picture reproduction, since the setup parameters can not be changed by physical factors such as temperature and the passage of time.

Faithful Reproduction

Handling a wide variety of setup parameters with numerical values allows these values to be memorized on a Setup Card. This Setup Card can be moved from camera to camera drastically reducing variations among cameras in multiple camera operation.

Outstanding Flexibility

In order to maximize the flexibility of the digital processing, the camera processor LSIs are specifically designed to provide a variety of setup parameters and flexible parameter settings required for high quality EFP operation.

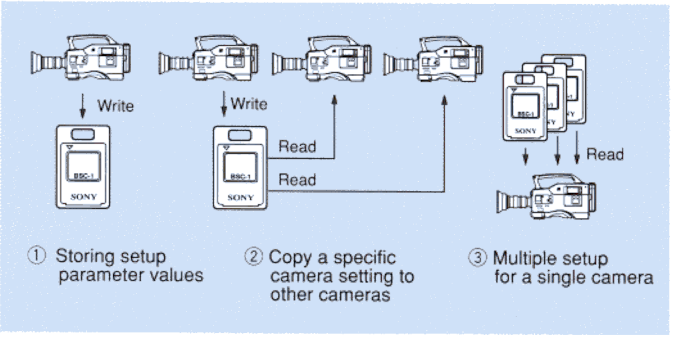
Compactness

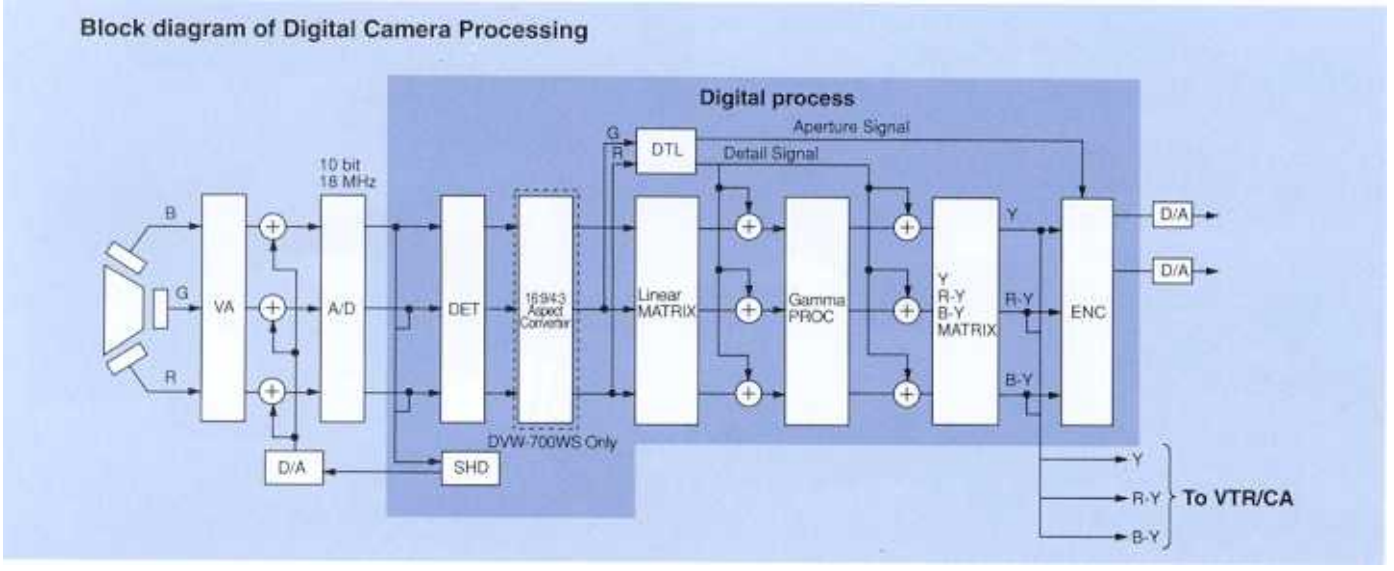
With the adoption of digital signal processing and the high density LSIs, Sony is able to pack a variety of functions in a compact unit.

Setup Card

A large number of setup parameters can be stored in a newly developed Setup Card, which provides great advantages to the camera operator. It is now possible to instantly set up a camera to the specific conditions preset in the Setup Card. This convenient function also allows a specific camera setup to be stored in the card and to instantly reproduce the same setup condition on any camcorder with this feature.

It also allows setup of multiple cameras to a uniform condition. The Setup Card adds great flexibility and dramatically improves operating efficiency.





Independent Detail Correction Files for 16:9/4:3 Modes

The DVW-700WS has independent image detail correction files for the 16:9 mode and the 4:3 mode and these values can be prestored in the setup card. Factory preset values of optimum aperture level and horizontal detail frequency for both 16:9/4:3 are stored in the DVW-700WS.

Setup Card Compatibility

Setup parameters stored with the DVW-700 can be read and reproduced with the DVW-700WS and vice versa.

Selectable Gamma Correction Curve

The DVW-700/700WS have two preset memories for gamma correction. With the adoption of digital signal processing, the precise shape of the gamma curve can be approximated with much more precision than the straight line approximation of analog processing.

Variable Linear Matrix

The DVW-700/700WS employ a linear matrix circuit which electrically adjusts the basic R, G, B color, taking characteristics of the camera, for optimum colorimetry. The linear matrix coefficients can be varied to reproduce a desired color tone or to provide a color match among dissimilar cameras. Two sets of matrix coefficients can be stored in memory, they can be instantly recalled at the user's discretion.

Variable Detail Frequency

For flexibility in adjustment of detail enhancement, the horizontal detail frequency can be varied over the range of 2.0MHz to 6.5MHz. This function allows the frequency of the detail enhancement to be matched to the content of the scene or to the bandwidth of the VTR or other output device that is used.

Skin Tone Detail

The DVW-700/700WS incorporate a Skin Tone Detail function which reduces the level of the detail signal for skin tone objects in the picture. This feature provides a pleasing reproduction of the skin of the actors while maintaining full crispness in all other portions of the picture. Hence, detail enhancement can be freely applied without worrying about accentuating normal imperfections in the complexion of the performers.

Detail Clip

In order to prevent the creation of an excessive detail signal in an area of the picture with extreme highlights or stepping lines along slanted picture edges, the detail clip level can be varied for both horizontal and vertical detail enhancement.

Level Dependence and Crispening

The Level Dependence circuit restricts detail enhancement for video signals near black to eliminate unnecessary correction in this area of the picture. In addition, Crispening is used to inhibit the creation of a detail signal for small transition in the picture providing effective detail enhancement without amplifying low level noise.

Knee Correction Control and Dynamic Contrast Control

In order to capture highly contrasted objects as clearly as possible, the DVW-700/700WS employ knee correction circuitry to retain picture detail even in very bright areas. Both the knee point and knee slope are variable with fine adjustments to match differing shooting conditions. With this knee correction capability, the dynamic range of the camera can be extended up to 600%. Furthermore, adjustment of the knee correction can be automated by the use of the Dynamic Contrast Control (DCC) circuitry that can automatically adjust knee parameters according to the intensity of the scene content. The degree of the DCC action can be set via the menu system to meet various requirements.

Black/White Shading Compensations

For easy camera setup, automatic black and white shading compensations are built into the DVW-700/700WS. Automatic black shading is used to correct for uneven dark sensitivity caused by thermal characteristics of the processing circuitry, while automatic white shading compensates for irregularities in white reproduction caused by optical devices such as lenses and prisms. By adjusting relevant parameters in the digital domain, these corrections are completed within a short time, eliminating the time consuming manual adjustments which are necessary with analog processing cameras.

Cross Color Suppression

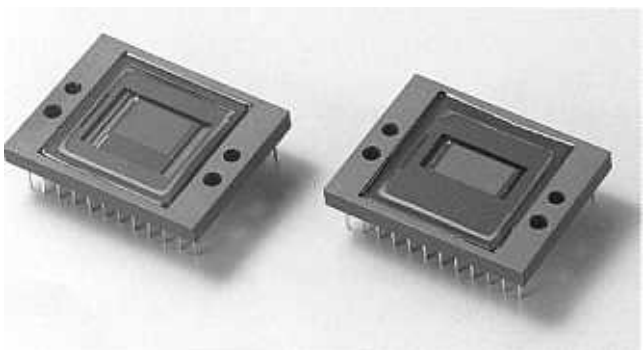
When shooting diagonal stripes, cross color artifacts can appear on the composite output from interference between the subcarrier and luminance elements of the composite video signal. In order to minimize these artifacts, the DVW-700/700WS are equipped with a cross color suppression function which limits the level of the luminance signal within the frequency bands onto which the subcarrier signal is to be added. With this function, stripes and lattice patterns can be clearly reproduced without reducing the horizontal resolution of the camera.

Hyper HAD 1000 CCD

The DVW-700 incorporates the Hyper HAD 1000 sensor whose outstanding performance has been well-proven in the Sony BVP Series of studio and portable cameras. A total of 520,000 picture elements are packed into this CCD sensor. This high packing density, combined with Sony's sub-micron manufacturing techniques provides highly accurate spatial offset of the three imagers to achieve an outstanding high depth of modulation around 70% at 5MHz.

Hyper HAD 1000 16:9 Widescreen CCD

The DVW-700WS incorporates three newly developed Hyper HAD 1000 FIT 16:9 Widescreen CCDs to capture widescreen pictures. Each is packed with 520,000 picture elements, the same as the conventional 4:3 Hyper HAD CCD. With this CCD, switching from 16:9 to 4:3 is easily executed without an external unit.



Hyper HAD 1000 CCD/Hyper HAD 1000 Widescreen CCD

High Sensitivity

Despite the high packing density of the Hyper HAD 1000 CCD sensor, the DVW-700/700WS provide the incredibly high sensitivity of F 8.0 at 2000 lx by the use of an OCL (On-Chip-Lens) layer which effectively converges incoming light onto each photo sensitive element.

Reduced Vertical Smear

Taking full advantage of the Frame Interline Transfer method, coupled with the HAD sensor™ structure and OCL (On-Chip-Lens) layer the vertical smear level has been reduced to a level where it is imperceptible.

Minimum Aliasing and Improved Frequency Response

The increased number of picture elements of the Hyper HAD 1000 sensor in combination with an exclusive wide band optical low pass filter design drastically reduces aliasing and significantly improves frequency response of the Red, Green and Blue baseband signals. As a result, a very high depth of modulation has been achieved.

Super Enhanced Vertical Definition System (Super EVS)

In order to take advantage of both the high vertical resolution of the frame integration mode and the superior motion blur reduction of the field integration mode, the Super Enhanced Vertical Definition System is featured in the DVW-700 and in the DVW-700WS. In this system, the electron charges accumulated in the imager are read out every 1/60 second in the same manner as in the field integration mode, however, the charges in pairs of adjacent lines are not simply added as in the conventional field integration mode. Instead a small amount of the charges accumulated in one of the adjacent lines is added to the total charges accumulated in the current line being read out, establishing a mechanism similar to the frame integration mode. The result is an enhanced vertical resolution of 450 TV lines without motion blur or line flicker often seen in the normal frame integration mode.

Dual Optical Filter

The DVW-700/700WS incorporate two separate optical filter wheels, one wheel is dedicated exclusively for ND (Neutral Density) filters and the other for CC (Color Conversion) filters to balance the camera under a wide range of color temperatures, while using the lens at its optimal f-stop. Four types of filters are built in each wheel; ND (Clear, 1/4, 1/16, 1/64), CC (Cross, 3200K, 4300K, 6300K). Various combinations of these filters also expand creativity.

Variable Speed Electronic Shutter

In order to capture clear images of high speed moving objects without motion blur, various electronic shutter speeds are available; 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000. The increased sensitivity of the Hyper HAD™ sensor makes it more practical to use even these extremely fast shutter speeds.

Clear Scan™ and Extended Clear Scan

When shooting computer displays with conventional cameras, a horizontal band appears across the display screen. This phenomenon is caused by the difference in the scanning frequency between the camera and the computer display. The DVW-700/700WS have both Clear Scan and Extended Clear Scan mode to eliminate this banding effect, by matching the shutter speed of the camera to the computer scanning frequency over the range from 30.4 to 7000Hz (508 steps). Extended Clear Scan adopts a special technique to enable shutter speed below the NTSC field rate, from 30.4Hz to 58.3Hz.

Programmable Master Gain-up Mode

To capture subjects in a dark environment with a maximum signal to noise ratio, the DVW-700/700WS provide a wide-range of gain-up values; -3, 0, 3, 6, 9, 12, 18, 24, 30dB. Any three of these values can be assigned to the three position LOW/MEDIUM/HIGH gain switch prior to the actual shooting, making the camera ready for the planned shooting situation.

Automatic Function

Automatic Iris Control

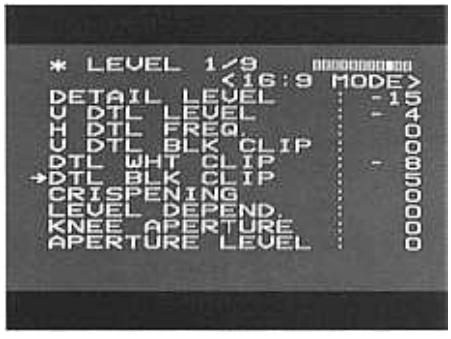
Automatic Iris Control is provided to keep an optimum aperture even if the brightness in the shooting area is changed, allowing the user to concentrate on framing and focusing. A sophisticated electronic feedback system ensures quick response. Furthermore, Iris Override can also be used to vary the nominal set point of the automatic iris control over the range of -0.5 to +0.5 F-stop, in increments of 0.25 F-stops.

Automatic Black and White Balance

Automatic black balance adjusts the black level of each of the R/G/B signals to maintain black balance of these three signals at any gain-up level. Automatic white balance adjusts the gain of the R, G, B channels to ensure faithful color reproduction under any color temperature. Two white balance settings can be memorized for each of four CC filters to instantly change the balance when it is necessary to continuously shoot a subject as the subject transitions from one color temperature illumination to another.

Comprehensive Menu Control

All setup parameters are well organized in a two layer menu, categorized as User and Engineer menus. While the Engineer menu provides access to all of the camera parameters, only selected parameters can be accessed in the User menu to prevent accidental changes to the settings. Furthermore, the user can eliminate rarely used parameters from the User menu and leave only the frequently used menu pages to appear so that setup can be efficiently completed without seeing full menu pages. Menu pages are provided both in the viewfinder and through the video outputs, allowing convenient and comprehensive setup. The setup menu system is controlled by a combination of two switches and UP/DOWN buttons.



<DVW-700WS>

Viewfinder Aspect Ratio

The viewfinder aspect ratio of the DVW-700WS is automatically switched by the 16:9/4:3 mode selection. A "squeezed" widescreen picture can also be shown in the 4:3 format. A x3 magnifying viewing lens is used for better visibility of the viewfinder CRT.

New View Finder

A new 1.5-inch monochrome viewfinder is provided with the DVW-700 and the DVW-700WS, which offers a 600 TV lines of horizontal resolution with virtually no flare. The dual peaking circuitry provides very crisp images to enable precise focusing.

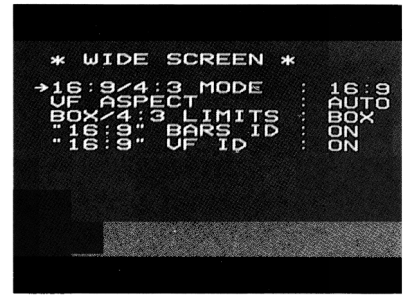
The CRT provides the following character indications to the operator advising of the following camera conditions: Extender, Zoom position, Filter position for both ND and CC filters, Auto white balance memory, Master gain, Shutter speed including Clear Scan and Extended Clear Scan speed, Iris position, Tape remain time, Camera ID.

In the DVW-700WS, 16:9/4:3 mode indication can also be shown.

<DVW-700>

These indications can be hidden at the user's discretion by setting the appropriate parameters in the menu control system. Additionally, the exclamation mark indication can be used to warn of non-standard operation when any of the following functions Gain-up, Shutter, Preset white balance, Extender, Unusual filter positions and Iris override are activated.

A safety zone (80% or 90%), a center marker and a box cursor can also be displayed on the viewfinder frame according to the menu setting.



<DVW-700WS>

When the DVW-700WS in used in the 16:9 mode, different types of 4:3 limits and box cursors can be selected to help in shooting 16:9 material that may be converted later into the 4:3 mode. Two level zebra video indication is also provided which ensures optimum iris adjustment while in manual iris operating mode.

<DVW-700WS 4:3 Limits ON>

New Eyecup

A new eyecup is supplied with the DVW-700/700WS. It uses a soft sponge pad and bellows construction which provides freedom of movement while maintaining a light tight seal. In comparison to a conventional rubber eyecup, this new eyecup is much softer and keeps its softness even under cold temperatures. The new eyecup is easily detachable and the conventional eyecup can be readily substituted depending on the user's preference.
In addition, the complete eye-piece can be easily removed from the viewfinder allowing direct view of the CRT. Three optional eye-pieces are available for various requirements, including high magnification, low magnification and standard magnification with special compensation for aberrations.

Genlock Capability / Camera Return

Genlock capability is incorporated, allowing the DVW-700/700WS to be integrated into a multi-camera system. Camera Return can be also accessed through the common connector.

Optional RM-P9 Remote Control Unit

Using the RM-P9 Remote Control Unit, basic functions and adjustments of the DVW-700/700WS can be remotely controlled.
The RM-P9 is interfaced with a 6-pin cable with a maximum length of 100 meters.

NOTE: The parameter settings which are controlled with the RM-P9 cannot be stored in the Setup card.

Test Output

The DVW-700/700WS incorporate a test output port which provides composite video, red, green or blue signals for camera testing.

Camera ID

For easy confirmation of which camcorder was used for an individual recording, a camera ID can be superimposed on color bars. The camera ID can be set as part of the system control menu.

Color Bars

When the DVW-700WS is in the 16:9 mode, "16:9" characters can be superimposed on the color bars for easy reference of the aspect mode in use.

Easy Maintenance

The DVW-700/700WS incorporate a sophisticated diagnostic system which detects malfunctions within the camcorder. The adoption of digital signal processing has improved the ability to specify the precise location and nature of a fault. Warning indications are provided through the camera viewfinder for faults in the camera section and on the LCD display for faults in the VTR section. In addition, plug-in boards are used for almost all the circuitry in the DVW-700/700WS, this allows quick and easy maintenance.

SYSTEM VERSATILITY

CA-701
Camera Adaptor

<DVW-700 with CA-701 and BP-L60>

With the advantage of a SDI (Serial Digital Interface) providing component digital video transmission and the capacity to record four channels of high quality digital audio, the CA-701 Camera Adaptor further extends the wide range of application of the DVW-700/700WS camcorders beyond EFP (Electric Field Production), to Electronic Cinematography and studio application.

When the CA-701 is connected to the DVW-700/700WS camcorders, all four audio channels provided by the Digital BETACAM recording format become available for use.

Furthermore, the CA-701 provides two SDI outputs. Each SDI output carries the video output of the camcorder plus four embedded audio channels, so that only a single coaxial cable is required to connect the camcorder to a monitor, a digital switcher or other equipment with a SDI input.

Four Channel Audio Recording Capability

When the CA-701 is connected to a DVW-700/700WS, 4-channel audio recording is possible. The CA-701 provides record/playback connections to audio channels 3 and 4, while the connection to channels 1 and 2 is provided on the camcorder itself. All four audio channels can be used simultaneously. The input levels of channels 3 and 4 can be independently controlled and monitored on the CA-701 via a LCD level meter. Connection to CH-3 and CH-4 is via standard XLR connectors with provision for phantom power for the microphones.

SDI Output

The CA-701 adds two SDI output connections (BNC) to the camcorder. The SDI outputs provide component digital video and four embedded audio signals via a single coaxial cable, allowing a simple connection with other SDI equipped devices. The component digital signal provided by the SDI port makes it possible to monitor the quality of the video being recorded much more precisely than via the composite video output normally provided on the camcorder. Similarly component video playback is available via the SDI output.

Versatile Audio Monitoring

For monitoring the audio signals, the CA-701 has two output connectors; AUDIO OUT (XLR) and HEADPHONE (stereo standard phone jack). Individual monitoring of all four audio channels is also provided via the adaptor.

Flexible Power Connections

The camcorder can be powered via the DC input of the CA-701. In addition, the CA-701 can power a wireless microphone receiver via a 4-pin connector.

Direct Connection to the Camcorder via a Built-in 40-pin Connector

The CA-701 attaches directly to the DVW-700/700WS with the built-in 40-pin docking connector. Quick, easy and stable attachment of the CA-701 is ensured by the V-shoe attachment and two screws at the top of the camcorder.

Other Features

- Compact and lightweight, approximately 1.0kg (2 lb 3 oz)
- Low power consumption, approximately 7W
- BVF-55 5-inch viewfinder can be used with the CA-701

<DVW-700 with CA-701 and BP-L60>

CA-755

Triax CCU Adaptor

Camera Adaptor for DVW-700/700WS

<DVW-700, CA-755 and CCU-550>

With a compact design, superb performance features and the excellent picture quality, the DVW-700/700WS meet and exceed the criteria for an outstanding EFP production tool. To further enhance the capabilities of these camcorders to studio and multi-camera EFP applications, Sony has designed the CA-755 triax camera adaptor to integrate the DVW-700/700WS into the Sony studio camera systems. When the DVW-700/700WS is used with the CA-755, all necessary functions of the camcorder can be precisely and remotely controlled from the CCU-550 Camera Control Unit via a single triax cable.

New Command Network System

Making good use of its extensive experience in multi-camera studio and OB truck installations, Sony re-examined the whole studio camera architecture with a goal of structuring a far higher degree of system flexibility. The new Command Network architecture is mainly based on:

–Introduction of a powerful technical "nerve center" concept

–Electronically assignable camera Remote Control Panel

Camera Control Unit

When the DVW-700/700WS is used with the CA-755 Camera Adaptor, precise camera setup parameters such as gamma, detail, iris control, electronic shutter speed, etc. can be remotely controlled from the CCU-550 directly, from the RCP-720/721 Remote Control Panels or from a MSU-700 (Master Setup Unit) connected to the CCU-550. Thus the DVW-700/700WS can easily integrate into a multiple camera shoot with other cameras in the field or the studio.

Note: Parameter settings which are controlled with the CCU-550 via CA-755 can not be stored in the Setup Card.

Long and Variable Signal Transmission

The CA-755 connects to the CCU-550 via triax cable. Operation with up to 600m of ø8.5mm diameter cable and 1200m of ø14.5mm cable can be achieved. This triax system transmits the camera as analog component signal to the CCU. In addition, MIC, PGM, INCOM, RET VIDEO, REMOTE signals are transmitted through the triax cable.

Maximum Cable length

• 600m	with ø8.5mm triax cable	(Fujikura)
• 1200m	with ø14.5mm triax cable	(Fujikura)

REC Capability with the DVW-700/700WS VTR

The operator can control the REC, REW and FF functions of the camcorder even when the camcorder is used with the CA-755 and CCU-550 system configuration.

Furthermore, when used in a multiple camera configuration, TC lock can be accomplished by connecting an external time code signal to each TC input of the cameras.

Direct Connection with the DVW camcorders

The CA-755 can be directly attached to the DVW-700/700WS with the built-in 40-pin docking connector. Quick, easy and stable attachment of the CA-755 is achieved via the V-shoe attachment and 2 screws at the top of the camcorder.

Compact and Lightweight

To complement the lightweight design and excellent balance of the camcorder, the CA-755 weighs only 1.9kg (4 lb 3 oz).

BVF-55 Viewfinder

The 5-inch monochrome viewfinder, BVF-55, can be used with the CA-755. Tally indication as well as center marker, safe area indication can be shown for EFP and studio operation. When the DVW-700WS is used in the 16:9 mode, the BVF-55 shows the correct aspect ratio image in the view finder.
(Requires BVF-55 with serial No. 10991 and up)

<DVW-700 with CA-755>

BZP-100

Camera PC Set-up Unit

With the introduction of DSP (Digital Signal Processing), it is now possible to provide the camera operator control of almost all camera parameters via a menu type control system. Unfortunately, as the operator is given more adjustments to optimize the performance of the camera for each application, the need to manually page through the camera menus to verify the setting of each camera parameter is sometimes making camera operation more complex. The BZP-100 camera PC setup system is intended to restore easy camera operation and still retain the full capability to control all camera parameters. All camera parameters can be easily configured from a standard PC, personal computer. Furthermore the BZP-100 control system is also capable of managing a multi-camera system network.

Easy Camera Setup with GUI-based Operation

Cameras, to say nothing of camera network systems, have an enormous amount of parameters to be setup. With a GUI specially designed for the DSP cameras, the BZP-100 camera setup system is able to precisely and quickly control the camera setup parameters using a keyboard, a mouse and the well thought out GUI. All the setup parameters can be accessed via these 5 menu layers. Desired parameter can be quickly found by just selecting the displayed items on the layers.

- Operational Status
- Video Level
- Color
- Detail
- Audio (not utilized with the DVW-700/700WS)

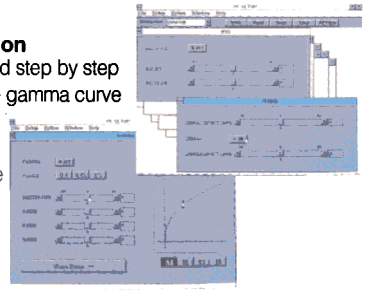
Using various switches and controls displayed on the GUI, these setup items can be controlled with intuitive operation. Followings are some examples of the operation of the GUI.

Paint Control

With a Scroll Bar, all parameters of the Paint Menus (Knee, Slope, Gamma, etc.) can be graphically controlled.

Selectable Gamma Table/Gamma Curve Modification

The value of gamma can be changed step by step with the UP and DOWN buttons. The gamma curve can be simply defined by selecting preset tables. Then it can be also modified by giving the numeric value directly.



In addition, the dialog boxes show setup choices, input forms, error messages, etc, to ensure reliable camera setup.

Data Filing Function

The camera setup parameters (Master Setup, Gamma, Log, Service information, etc.) is put together into a file. The files can be edited, downloaded and saved on a FDD or a HDD at will. Using different pre-set files according to application and need, the efficiency of multiple camera setup is greatly improved.

Flexible Operation

The BZP-100 is designed to meet a wide range of application. Camera operation can be optimized for: daily operation, customized setup, service maintenance, etc.

Easy Picture Matching

The time-consuming job to match pictures in a multi-camera configuration can be dramatically reduced by the use of the BZP-100. Applying the same setup data, multiple cameras can be instantly and simultaneously setup to produce uniform conditions from the remote PC.

Comprehensive Camera Network Control System

The BZP-100 Camera PC Set-up Unit can also be integrated into the Sony studio camera systems using a CNU, Command Network Unit. When the BZP-100 is connected to the CNU of a multi-camera system, the setup of the individual cameras can be adjusted via their respective CCUs. In addition, the BZP-100 can share control of a camera system with MSUs, RCPs and other system peripherals.

Interface Box (Protocol/Command Connector)

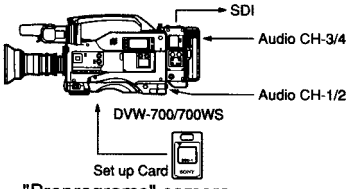
The Sony ISR, Interactive Status Reporting, protocol has been developed to report on the status and help in the maintenance of large systems. The "Interface Box" included with the BZP-100, allows camera products that do not support the ISR protocol directly to be integrated into an ISR system. The Interface Box accepts standard ISR commands and translate them such that cameras that respond to either the original Sony Camera Remote or the new Command Network protocol can be integrated into an ISR system.

SYSTEM CONFIGURATION

1. Film Style Shooting

Used on:

Television Commercial Production
Documentary
Natural History

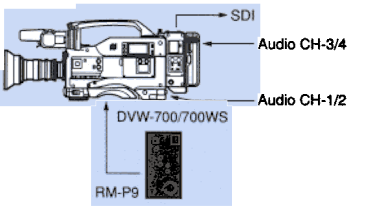


"Preprograms" camera
for particular video "Look"

2. EFP Style Shooting

Used on:

Drama Location Shoot
Sports
Special Events

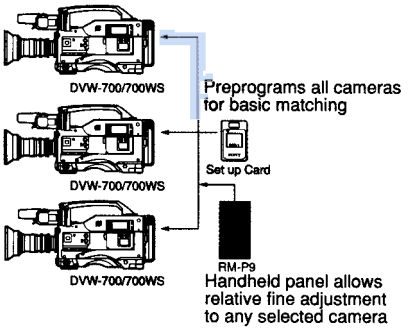


3. Multiple Camera Video Shoot

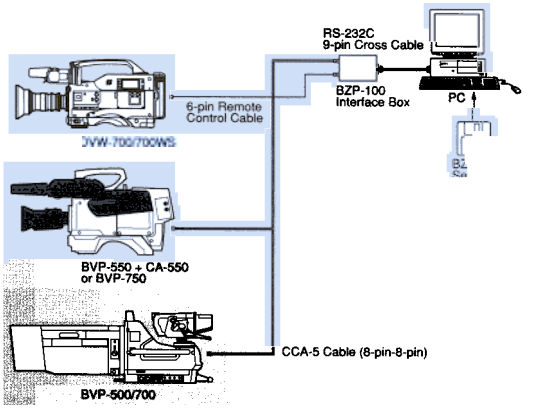
Used on:

Special Event
Sports

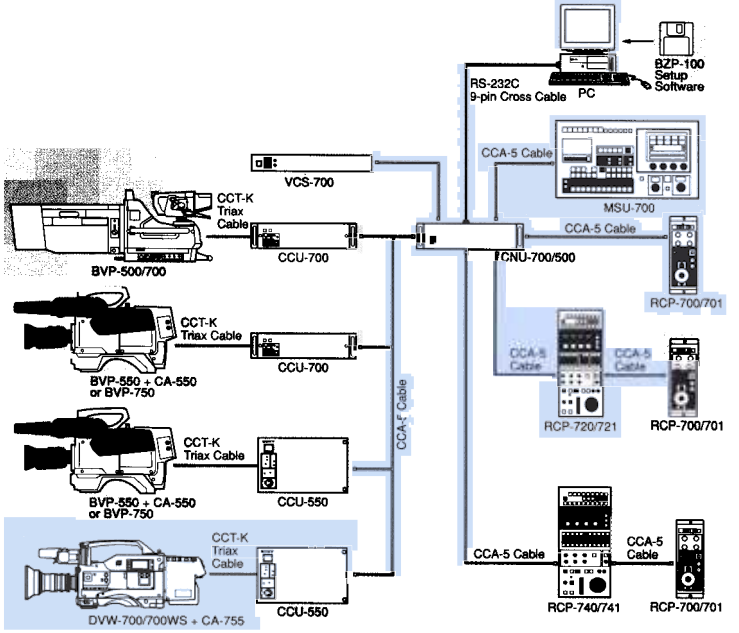
Example 1



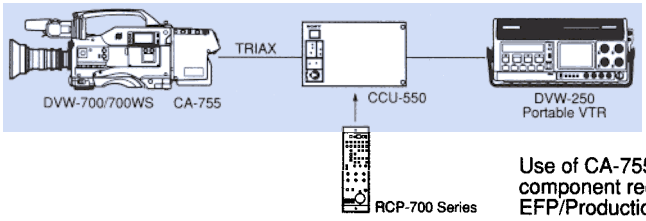
Example 2



Example 3



4. Basic System

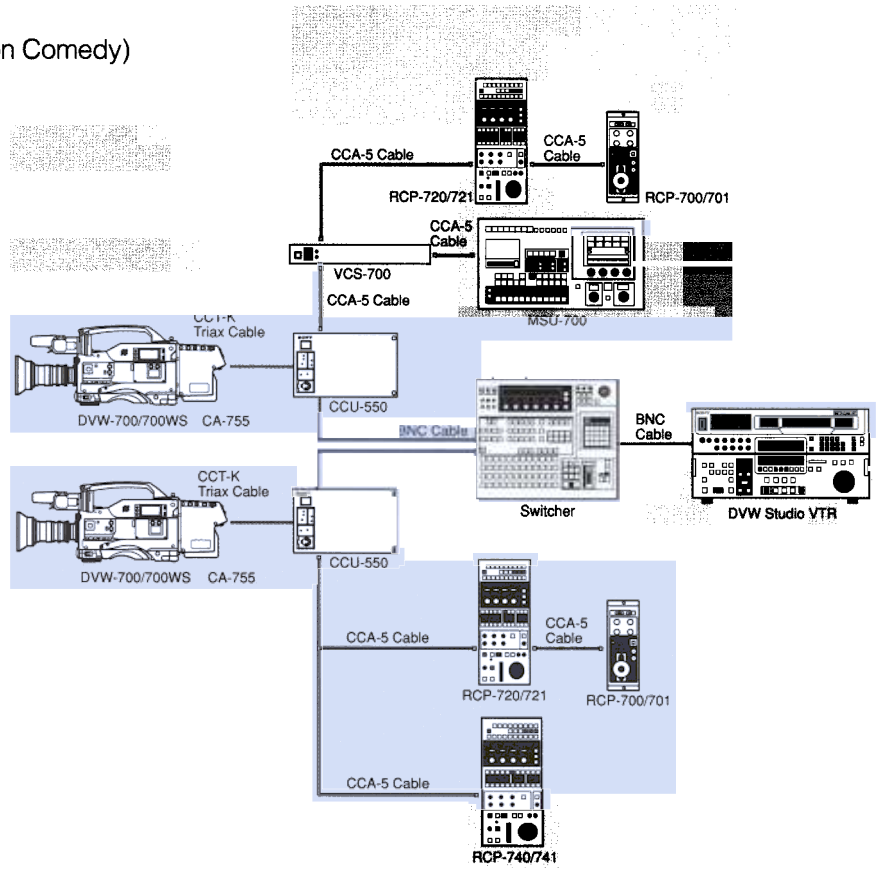


Use of CA-755 to make parallel component recording within an EFP/Production System

5. ISO-Recording with Simultaneous Switched Output Recording

Used on:

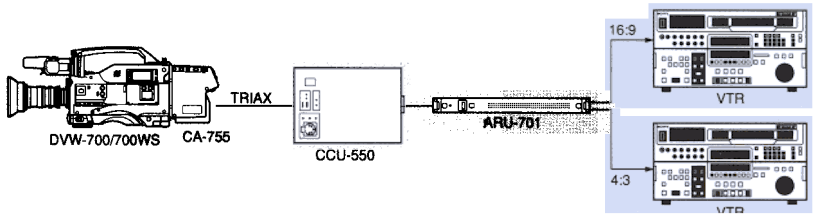
SITCOM (Situation Comedy)
Drama
Game Show



6. Simultaneous 16:9 and 4:3 Origination

Used on:

All programming created having significant archival value
Simultaneous 16:9/4:3 Broadcast System



OPTIONAL ACCESSORIES

Setup Card
(Package of four Setup Cards and a soft case)
BSC-1-Pack

Rechargeable Lithium-ion Battery
BP-L90

Rechargeable Lithium-ion Battery
BP-L60

Battery Case for an optional BP-90A NiCd Battery
DC-L90

Battery Case for an optional NP-1B NiCd Battery
DC-L1

Battery Charger for four BP-L60's and BP-L90
BC-L100

Battery Charger for four BP-90A's and four NP-1B's
BC-410

Battery Charger for four NP-1B
BC-1WD

AC Adaptor
AC-DN-1

AC Adaptor
AC-550

Wireless Microphone Receiver
WRR-860A

Remote Control Unit
RM-P9

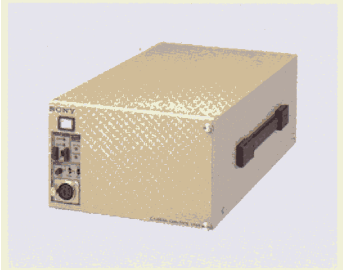
Viewfinder Rotation Bracket
BKW-401

Camera Adaptor
CA-701

Camera Adaptor for CCU-550
CA-755

Camera Adaptor for CCU-355
CA-705

5-inch Viewfinder
BVF-55



Camera Control Unit
CCU-550

Camera Control Unit
CCU-355

Return Video Selector
CAC-6

Servo Filter Unit
BKDW-701

Extension Board for CA-705/755
EX-454

Viewfinder Eye-piece
High magnification : A-8262-537-A
Low magnification : A-8262-538-A
Standard magnification with special compensation for aberrations : A-8267-737-A

Viewfinder Eye-piece
(High Performance (x3): A-8314-798-A)
Supplied with DVW-700WS

2.0-inch 16:9 B/W Viewfinder
BVF-V20W

1.35-inch 16:9 Color Viewfinder
BVF-VC10W

1.5-inch 4:3 B/W Viewfinder
BVF-V10

Camera PC Set-up Unit
BZP-100

Rain Cover for DVW-700/700WS with CA-701/755/705
3-188-446-01

Carrying Case
LC-777

Digital Video Cassette
BCT-D6/D12/D22/D32/D40

Video Head Cleaning Cassette
BCT-D12CL

SPECIFICATIONS

DVW-700/700WS

General

Weight	Approx. 5.0kg (11 lb)
Operating weight	Approx. 7kg (15 lb 7 oz)
Power requirements	DC 12V +5.0/-1.0V
Power consumption	28W (rec mode)
Operating temperature	0°C to +40°C (+32°F to +104°F)
Storage temperature	-20°C to +60°C (-4°F to +140°F)
Humidity	25% to 85% (relative humidity)
Continuous operating time	Approx. 120 min (with BP-L60) Approx. 180 min (with BP-L90)

Signal inputs

Genlock video	BNC, 1.0Vp-p, 75Ω
Time code	BNC, 0.5 to 18Vp-p, 10kΩ
Audio CH-1/2	XLR 3-pin, -60dBm/+4dBm selectable, high impedance, balanced

Signal outputs

Video output	1.0Vp-p, 75Ω, sync negative, two outputs
Time code	BNC, 1.0Vp-p, 75Ω
Earphone	Mini jack

Others

Lens	12-pin
Remote	6-pin
DC input	XLR 4-pin (for the optional AC-550)
DC output	4-pin (for wireless microphone receiver), DC 12V, Max. 100mA

VTR SECTION

General

Recording format	Digital BETACAM
Tape speed	96.7mm/s
Playback/Recording time	Max. 40 min with BCT-D40 cassette
Fast forward time	Less than 6 min with BCT-D40
Rewind time	Less than 5 min with BCT-D40
Recommended tape	Sony BCT-D6/D12/D22/D32/D40
Sampling frequency	Y: 13.5MHz R-Y/B-Y: 6.75MHz
Quantization	10 bits/sample
Error correction	Reed-Solomon code
Error concealment	Adaptive three dimensional

Video performance

Bandwidth	Y: 5.75MHz ±0.5dB R-Y/B-Y: 2.75MHz ±0.5dB
S/N ratio	62dB or more
K-factor (2T pulse)	1% or less
Linearity	2% or less
Y/R-Y/B-Y delay	15ns or less

Digital audio performance

Sampling frequency	48kHz (synchronized with video)
Quantization	20 bits/sample
A/D and D/A quantization	16 bits/sample
Frequency response	20Hz to 20kHz +0.5dB/-0.8dB
Dynamic range (emphasis ON)	More than 85dB
Distortion (at 1kHz, emphasis ON, reference level)	Less than 0.08%
Cross talk (at 1kHz, reference level)	Less than -70dB
Wow & flutter	Below measurable limit
Head room	20dB
Emphasis (ON/OFF selectable)	T1=50 µs, T2=15 µs

Analog audio (Cue track) performance

Frequency responce	100Hz to 12kHz ±3dB
S/N ratio (at 3% distortion level)	More than 50dB
Distortion (T.H.D at 1kHz reference level)	Less than 1.5%
Wow & flutter	Less than 0.2%

* Reference level: +4dBm

* The specifications given above were measured by playing back DVW-700/700WS recorded materials on standard Digital BETACAM VTRs.

CAMERA SECTION

16:9/4:3 WIDESCREEN

Camera	DVW-700	DVW-700WS (16:9 MODE)	DVW-700WS (4:3 MODE)
Pickup device	3-chip 2/3-inch Hyper HAD 1000 FIT CCD	3-chip 2/3-inch Hyper HAD 1000 FIT 16:9 WIDESCREEN CCD	
Picture elements	Total:1038(H) x 504(V)		
Optical system	F1.4 prism system		
Built-in filters	A: CROSS B: 3200K C: 4300K: D: 6300K 1: CLEAR 2: 1/4ND 3: 1/16ND: 4: 1/64ND		
Shutter speed	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)		
Clear Scan	CLS: 60.1 to 7000 Hz (260 steps) ECS: 30.4 to 58.3 Hz (248 steps)		
Lens mount	Special bayonet mount		
Sensitivity	2000lx with F8.0, 89.9% reflective		
Minimum illumination	Approx. 1.9 lx (F1.4 lens, +30dB gain)		
Video S/N ratio (typical)	62dB		
Vertical resolution	(without Super EVS) 400 TV lines (with Super EVS) 450 TV lines		
Registration	0.05% (all zones, without lens)		
Geometric distortion	Below measurable level (without lens)		
Warm-up time	2s		
Modulation depth at 5MHz	70% (Typical)		55%(Typical)

Viewfinder

CRT	1.5-inch monochrome		
Controls	BRIGHT control, CONTRAST control, PEAKING control, TALLY, ZEBRA/MARKER and AUDIO indicator ON/OFF switches		
Horizontal resolution	600 TV lines	450 TV lines	600 TV lines
Microphone	Ultra-directional (detachable)		

Supplied accessories

Setup Card (BSC-1) (1)	Microphone (1)
Tripod Adaptor (VCT-14) (1)	Rain Cover (1)
Attachment Adaptor for Wireless Microphone Receiver (1)	
Shoulder Belt (1)	
Operation Manual (1)	
Maintenance Manual Part 1 (1)	

CA-701

Connectors

AUDIO IN:	XLR 3-pin x 2
AUDIO OUT:	XLR 3-pin
EXT DC IN:	XLR 4-pin
POWER IN:	
POWER OUT:	
EXT DC OUT:	4-pin
HEAD PHONE:	Stereo standard phone jack
SDI OUT:	BNC x 2
Digital BETACAM 40-pin:	Docking Connector to DVW-700/700WS

General

Power Requirement:	Approx. DC 12V +5.0/-1.0V
Power Consumption:	Approx. 7W
Operating Temperature:	0C° to +40C° (+32F° to +104F°)
Humidity:	25% to 85% (relative humidity)
Weight:	Approx. 1.0kg (2 lb 3 oz)

Supplied Accessories

Operation Manual (1)
Maintenance Manual (1)

CA-755

Connectors

DC IN:	XLR 4-pin, 11.5V to 17V
RET OUT	BNC, 1.0Vp-p, 75Ω
RETURN CONTROL:	6-pin
EARPHONE:	Mini-jack, 8Ω
CAMERA:	40-pin (DVW-700/700WS)
CCU:	KINGS type triax connectors
INCOM/PGM:	Headset XLR 5-pin

General

Power Consumption:	Approx. 11W
Weight:	1.9kg (4 lb 3 oz)

Supplied Accessories

Operation and Maintenance Manual (1)
Cable Clamp (1)
M3/M4 Screws for Cable Clamp (2x2)

BZP-100
General

Weight:	230g (8.1 lb)

BZP-100 System Components (* User supplied)

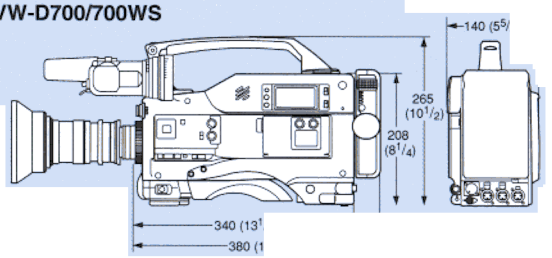
- BZP-100 Setup Software
- Interface Box
- Windows 3.1 Operating System Software *
- IBM® PC/AT Compatible *

Supplied Accessories

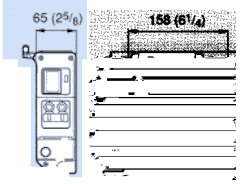
- SONAM Warranty Card (1)
- Customer Inquiry Card (1) Inst Model for UC only
- SVI Card (1)
- Examination Data Sheet (1)
- Operating Instructions (1)
- Operation Manual (1)
- Maintenance Manual (1)
- PC Interface Cable (1) RS-232C 9-pin Cross Cable
- RM Interface Cable (1) 6-pin Remote Control Cable
- CCA-5-10 Cable (1) 8-pin-8-pin Remote Control Cable

Dimensions

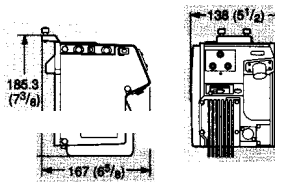
DVW-D700/700WS



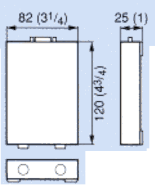
CA-701



CA-755

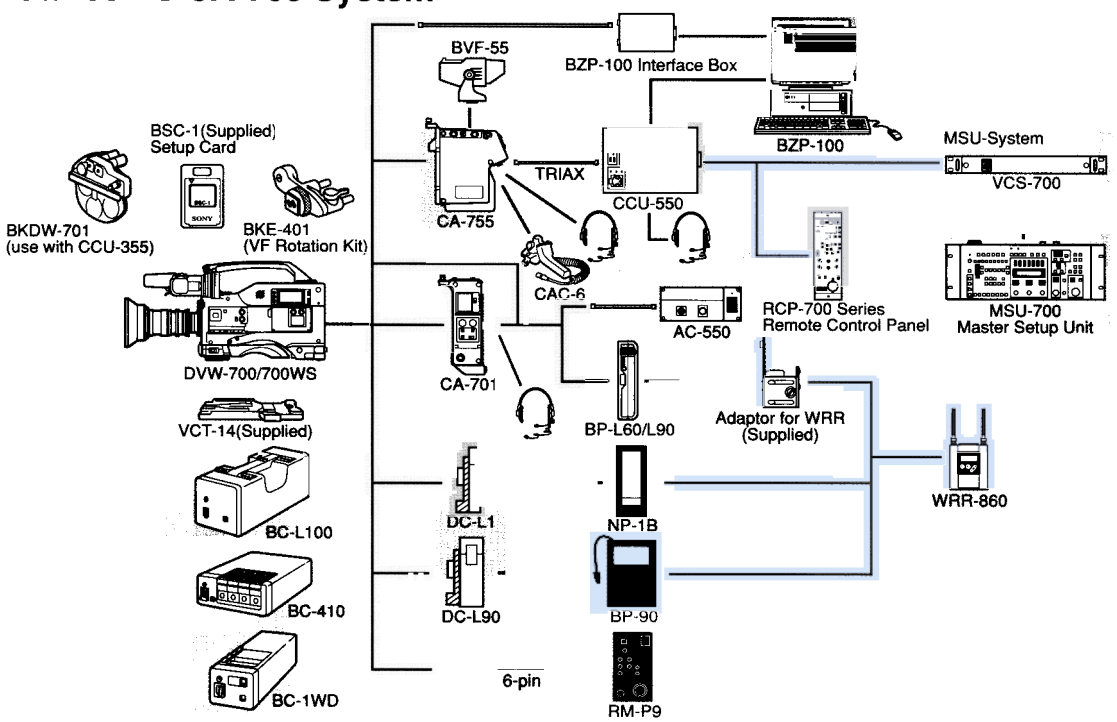


BZP-100 Interface Box



Unit: mm (inch)

DVW-700/700WS CA-705 System



Design a
"Betacar ster
"HAD Se ader
"IRM" is a register Mach

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